

Jan. 8, 1963

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GOLF GAME APPARATUS

3,072,410

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2 Sheets-Sheet 1

FIG. 1

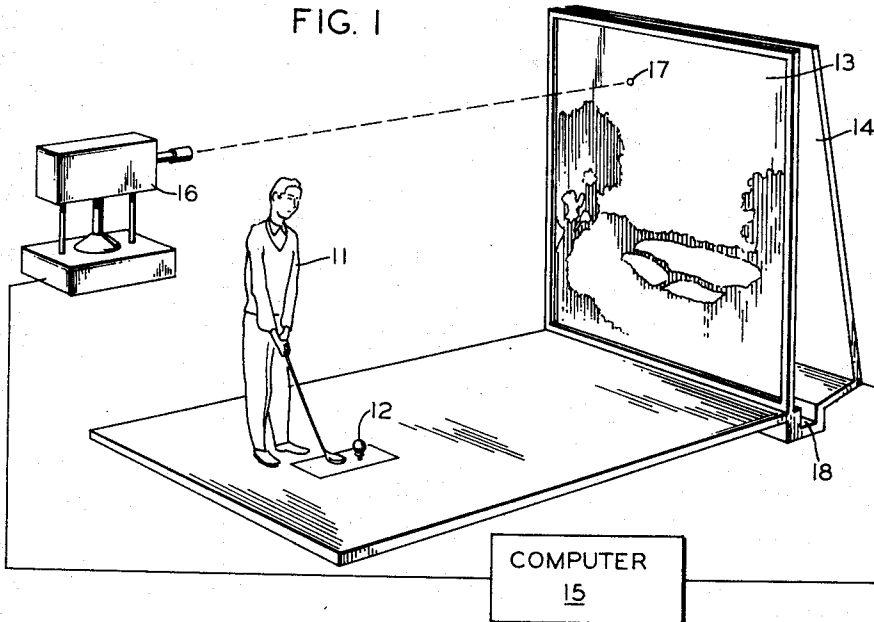


FIG. 3

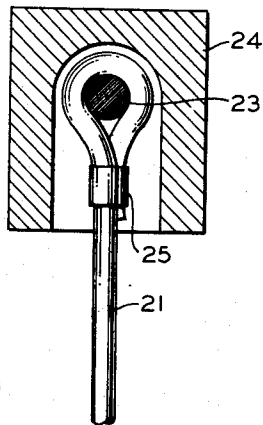


FIG. 2

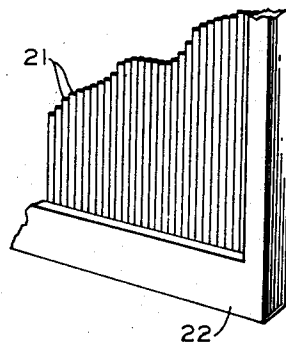
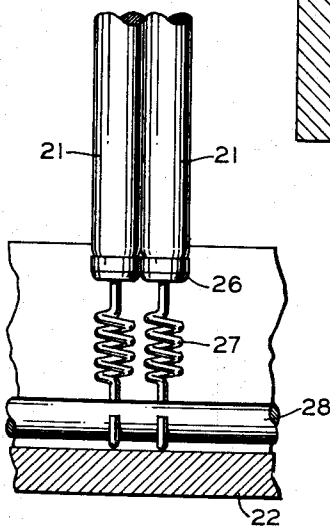


FIG. 4



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FIG. 5

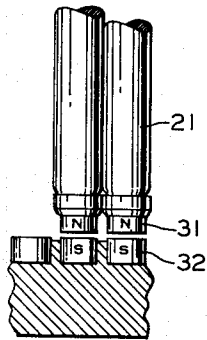


FIG. 6

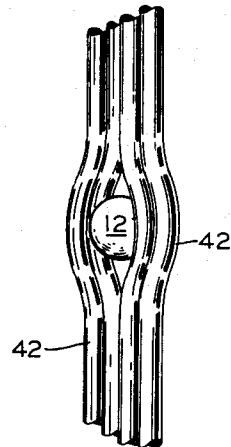


FIG. 7

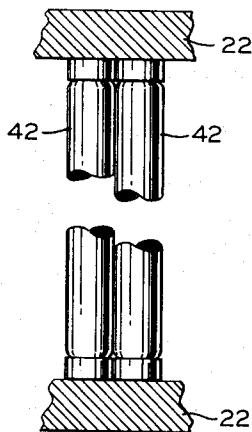
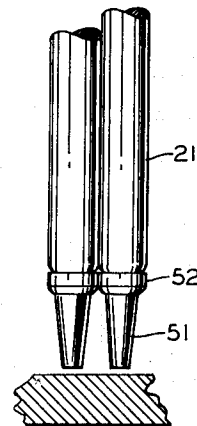


FIG. 8



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GOLF GAME APPARATUS

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11 Claims. (Cl. 273-185)

The instant invention is related to golf games and has particular reference to an indoor golf game apparatus which employs a projection screen adapted to be interposed between a player position and a target. More specifically, the present invention refers to a missile penetrable projection screen onto which an image is projected which traces the simulated free flight path of the missile after the actual missile has been propelled through the projection screen to an impact target disposed rearward of the projection screen. This invention moreover, is continuation-in-part application of my copending application for U.S. Letters Patent, Serial No. 789,860, filed January 29, 1959, now abandoned, which application refers also to embodiments first described in application for U.S. Letters Patent, Serial No. 539,328, filed October 10, 1955, now U. S. Patent No. 2,894,750, entitled: "Golf Game Apparatus."

When providing indoor targets for games which make use of a propelled missile such as a ball, the player usually faces a target. Often, the target or impact area is equipped with electrical or mechanical sensing means for deriving data related to the trajectory of the missile. The view thus presented to the player by the target and its sensing arrangement is not an appealing one and in many instances will distract the player. The instant invention attempts to overcome this problem by providing a screen which conceals the target, yet is sufficiently resilient and flexible to permit the passing of missiles therethrough. The screen itself is provided with a fixed scenery or varying scenes using standard projection techniques so that the view seen by the player more realistically simulates the visual conditions prevailing on an actual driving range or playing field. By the use of the screen described hereafter, the impact of the missile or ball upon the target and any deflection or rebound therefrom is no longer seen by the player, thereby greatly enhancing the psychological aspects of the game.

One of the objects of this invention therefore, is the provision of an improved arrangement for indoor games employing balls or other implements which are driven against an impact surface.

Another object of this invention is the provision of a projection screen for concealing an impact area disposed behind the screen.

Another object of this invention is the provision of a projection screen so constructed as to permit a missile which is driven against the screen to pass therethrough.

Another object of this invention is the provision of a screen for concealing an impact area, the screen comprising a plurality of closely spaced, displaceable elements to permit the momentary passing of a ball or missile therebetween.

Another and further object of this invention is the provision of a screen which comprises a plurality of elements yieldable under the impact of a missile to permit the passage of a missile therebetween and said yieldable elements exhibiting image forming qualities.

A further object of this invention is the provision of a screen comprising a plurality of elongated, resiliently biased elements which become displaced momentarily by a missile passing therethrough yet resume their normal positions swiftly after passage of the missile.

Still another and further object of this invention is the

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provision of an optical projection screen so constructed as to enable a missile to penetrate therethrough without causing permanent damage to the screen.

Further and still other objects of this invention will be apparent by reference to the following description taken in conjunction with the accompanying drawings in which:

FIGURE 1 is a perspective view of the general arrangement of the golf game apparatus;

FIGURE 2 is a perspective view of a portion of the projection screen;

FIGURE 3 is a sectional view for depicting the mounting of the elements which form the screen in FIGURE 1;

FIGURE 4 is a sectional view illustrating a typical embodiment for biasing the elements to assure their fast return to the normal position;

FIGURE 5 is an alternative embodiment of the biasing means illustrated in FIGURE 4;

FIGURE 6 is a perspective view of a screen portion showing the displacement of a few of the elements occasioned by a ball passing therebetween;

FIGURE 7 is an alternative embodiment of the screen structure, and

FIGURE 8 is a partial view showing another and alternative design for biasing the displaceable elements.

Referring now to the figures and FIGURE 1 in particular, numeral 11 identifies a player who propels a missile such as a golf ball 12 towards a projection screen 13 behind which there is disposed a target 14 which receives the impact of the ball and stops the ball. The target impact surface is provided with electrical or mechanical sensing means as described for instance, in U.S. patents, Nos. 2,784,001, 2,784,00, 2,783,999, and others issued to this applicant. The sensing arrangement which forms a part of the target 14 is connected to a computer 15 (shown as a block) which, in turn, controls a movable projector 16. The projector projects a movable image 17 on the screen 13, which image in its motion simulates the path of the ball in free flight. The sensing of the direction of the ball, the determining of the ball's velocity, and the subsequent derivation of the free flight path for controlling the motion of the projector have been described in detail in the above-referenced patents.

It will be observed that the ball 12 in its flight toward target 14 traverses the plane of the projection screen and actually passes through the screen which conceals the impact area of the ball. To enhance the presentation viewed by the players, the screen preferably is provided with a representation of a playing field, a golf course, or other suitable landscape or seascape. By means of the same projector 16 or by a further projector the scenery may be changed from play to play or periodically as may be desirable.

Balls coming to an impact on inclined target 14 are deflected downward and after having given up their kinetic energy come to rest in trough 18.

As has been indicated, the ball on its way toward target 14 is required to pass through the screen 13, yet the screen concealing the target must be such that the ball can pass therethrough substantially unimpaired and undeflected. To this end, screen 13 comprises a plurality of closely spaced elements 21 traversing in vertical direction the screen frame 22, FIGURE 2. The suspension of the individual elements is shown in FIGURE 3 wherein a longitudinal bar 23 mounted near the top of the screen frame 24 and concealed therein is used to retain the individual elements 21. Each element is looped about bar 23 and secured with a grommet 25. The closely spaced, individual elements therefore, form a tassel-like arrangement, each tassel or element hanging freely so that a ball driven against the target causes only a mo-

mentary displacement of the affected elements as the ball passes therebetween. In order to produce the image 17 generated by projector 16, the individual elements exhibit an image forming surface, being made from or equipped with opaque glass fibers. In an alternative manner, the tassels may be made from textile material which is interwoven with metallic threads, for instance, silver, aluminum, etc. In another alternative manner, the surface of the elements may be provided with glass crystals or beads as are used in conjunction with sheet-like optical projection screens.

FIGURE 4 depicts an improvement of the arrangement disclosed hereinabove wherein each of the elements 21 at the bottom of frame 22 is resiliently biased by employing a metal cap 26 and a tension spring 27 fastened around a transverse bar 28 located in the bottom of the frame. By virtue of this biasing arrangement, the individual elements 21 are swiftly returned to their normal position after the ball has momentarily passed therebetween.

FIGURE 5 shows a further variation of the biasing means and depicts a set of permanent magnets 31 and 32 respectively, which are polarized in such a manner as to attract one another. Again, the elements 21 are individually displaceable with the magnetic forces acting either to hold or restore the individual elements to their normal position.

FIGURES 6 and 7 illustrate a further variation by showing a projection screen which comprises a plurality of closely spaced elements 42, the end of each element being secured to opposite ends of frame 22. Element 42 is a so-called shock cord which is formed from individual strands of rubber enclosed in an outer casing. Each cord therefore, is elastic and will normally deflect under the impact of a ball 12 as shown in FIGURE 6. The outer casing, as explained hereinbefore, is made of optically suitable material by containing the necessary materials which enable the forming of an image thereon.

FIGURE 8 depicts still another variation, the bottom of each element 21 being weighted by a weight 51, for instance, a piece of lead secured to the respective tassel by using a grommet 52. In this embodiment weight alone is used as a biasing means.

Although the foregoing illustrations show a vertical arrangement of the individual elements, it will be understood that when biasing means as illustrated in FIGURE 4, or resilient elements as shown in FIGURES 6 and 7 are used, horizontally or angularly placed elements may be used without deviating from the intent and principle of the present invention.

Instead of round tassels other configurations of the elements may be used as long as the elements and optical materials are small enough to preserve the image without causing disturbing and unrealistic optical distortion apparent to the player.

The screen itself may be used for sensing the direction of the missile as disclosed in the patents referenced above. To this end, each element may be in communication with an electrical sensing switch which is actuated upon physical displacement of the respective tassel. The general arrangement and computing circuit for this modification will be apparent by referring to the above-named references.

The screen provided in front of the target clearly enhances the appearance and appeal of the play without interfering with the functioning of the target or its sensing array. Moreover, the screen remains usable for many games and any repair which becomes necessary is restricted to the replacement of individual elements.

While there have been described and illustrated certain embodiments of the present invention, it will be apparent to those skilled in the art that various further changes and modifications may be made therein without deviating

from the broad principle of the invention which shall be limited only by the scope of the appended claims.

What is claimed is:

1. A combination for use with a missile, comprising: a first means from which the missile is propelled; a target on which the missile is impacted;

a screen, having a substantially continuous structure, disposed between said target and said first means, comprising an array of a plurality of parallel, closely juxtaposed, elongated elements, each individually secured to a support and each adapted to be individually displaced by the missile from its neighbor element to pass the missile therebetween and through said screen and thereafter to return to its normal position in said array, said screen obscuring said target visually from said first means, reflecting light from the area on the side of said screen which is proximate to said first means back towards said area, and passing the missile through said screen without any substantial distortion of the trajectory of the missile;

impact sensing and computing means connected to said target for generating signals responsive to the impact of the missile on said target which are indicative of said trajectory of the missile;

and a projector connected to said computer for receiving said signals and in response to said signals projecting an image on said first means proximate side of said screen.

2. The apparatus of claim 1 wherein each of said elongated elements is resiliently flexible and has a reflecting surface thereon.

3. The apparatus of claim 2 further including means to resiliently bias each said element to its normal position in said array.

4. The apparatus of claim 2 wherein said support includes a first transverse member and a second, spaced apart transverse member, and each of said elements is resiliently secured longitudinally between said transverse members.

5. The apparatus of claim 2 wherein said elements are formed of opaque glass fibers.

6. The apparatus of claim 2 wherein said elements are formed of textile material which is interwoven with metallic threads.

7. The apparatus of claim 2 wherein said elements are surfaced with glass crystals.

8. The apparatus of claim 2 wherein said elements are surfaced with glass beads.

9. The apparatus of claim 3 wherein said bias means comprises a weight secured to one end of each said element.

10. The apparatus of claim 3 wherein said bias means comprises a spring connected between one end of each said element and a fixed member.

11. The apparatus of claim 3 wherein said bias means comprises a magnetic field producing means.

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